

THE SUEZ SHIP CANAL.

BY E. HEPPLÉ HALL.

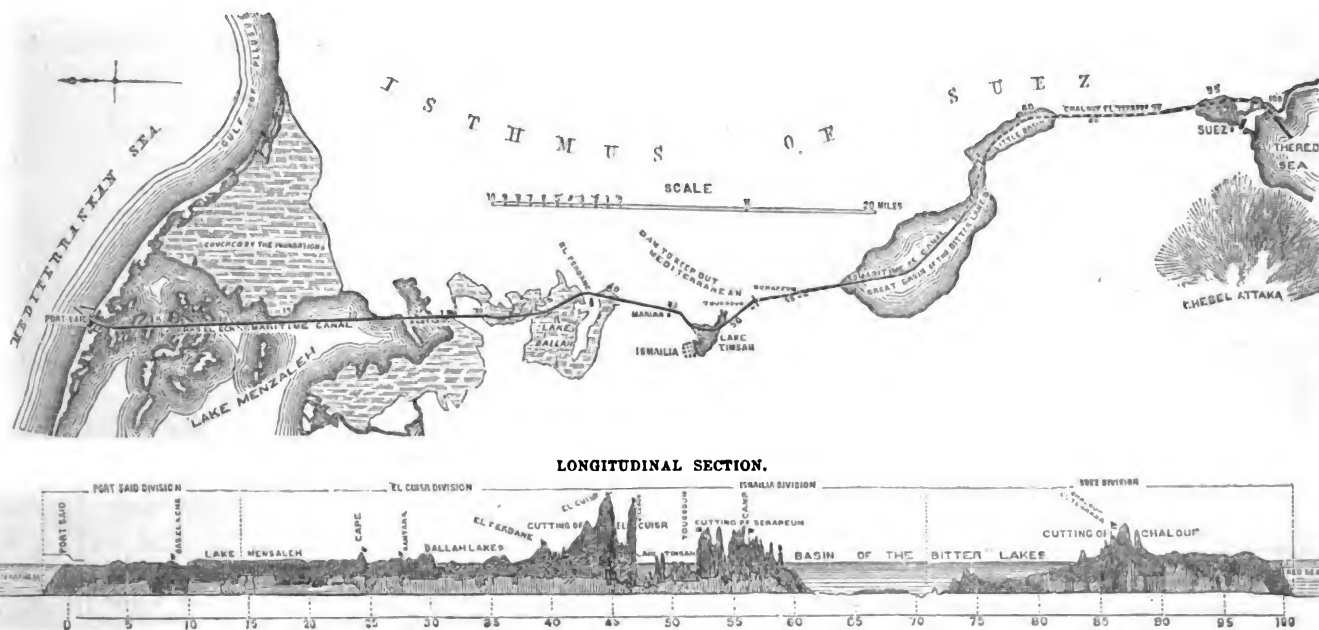
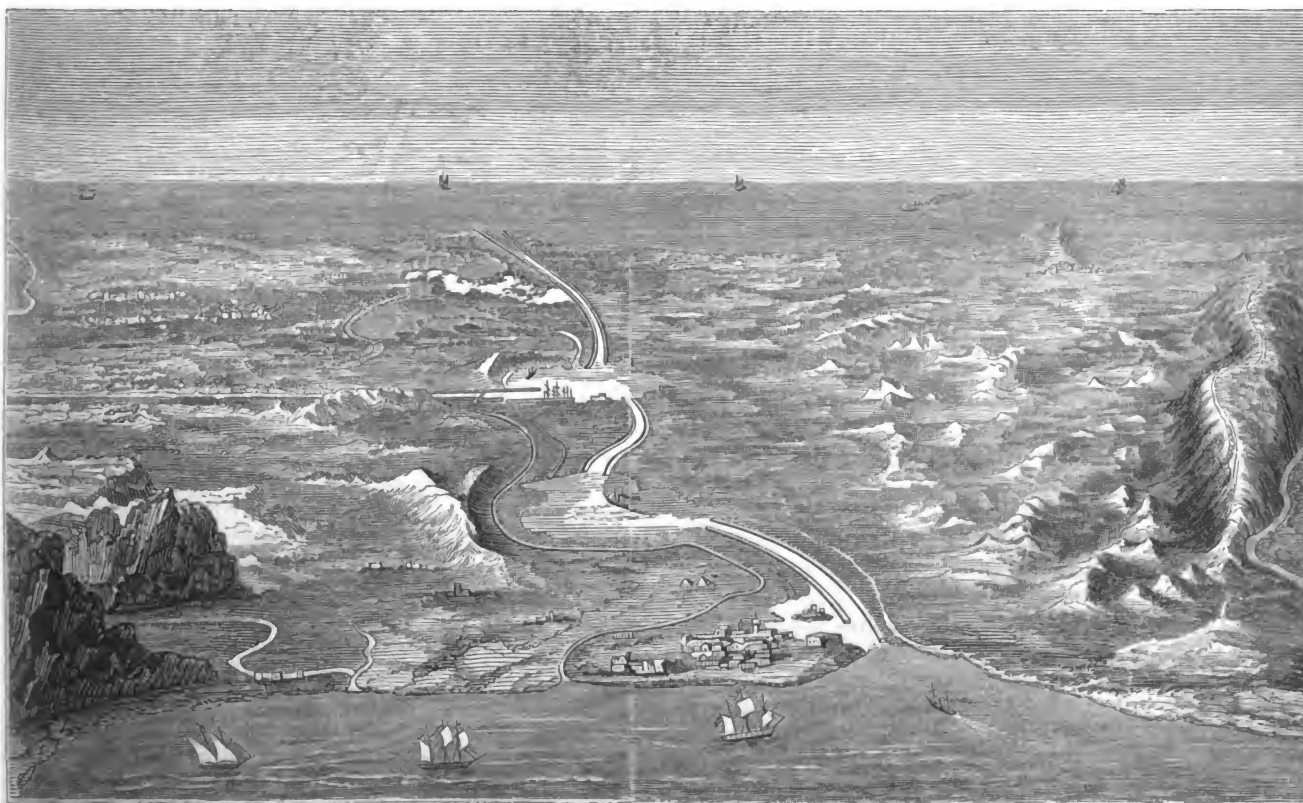


Diagram and Profile of the Track of the Canal.

IF we except the Great Continental Railway which now unites the Atlantic and Pacific coasts, and which, as a short-cut to the trade of the East, must be considered its most formidable competitor and rival, no great work of modern times has elicited so large a share of public curiosity, with apparently so little opportunity of having that curiosity gratified by actual observation, as the ship-canal across the Isthmus of Suez.

THE CANAL FIRST PROJECTED.—The first step toward the construction of the present canal was made nearly a quarter of a century ago. In 1846 a commission was issued to Robert Stephenson, son of the famous inventor of the locomotive, on the part of Great Britain; to Talabot, the great French contractor, on the part of France; and to Signor Negretti, the scientific chemist and engineer, on the part of Austria. During



General Bird's-eye View of the Canal.

that year the isthmus was surveyed by them, and the scheme pronounced feasible.

The only serious impediment to the success of the undertaking which then presented itself, was the continual danger to which the canal would be exposed by reason of the sand-storms on the desert. To meet this difficulty various mechanical remedies were proposed, and the enterprise pronounced practicable. Yet nothing further was then attempted.

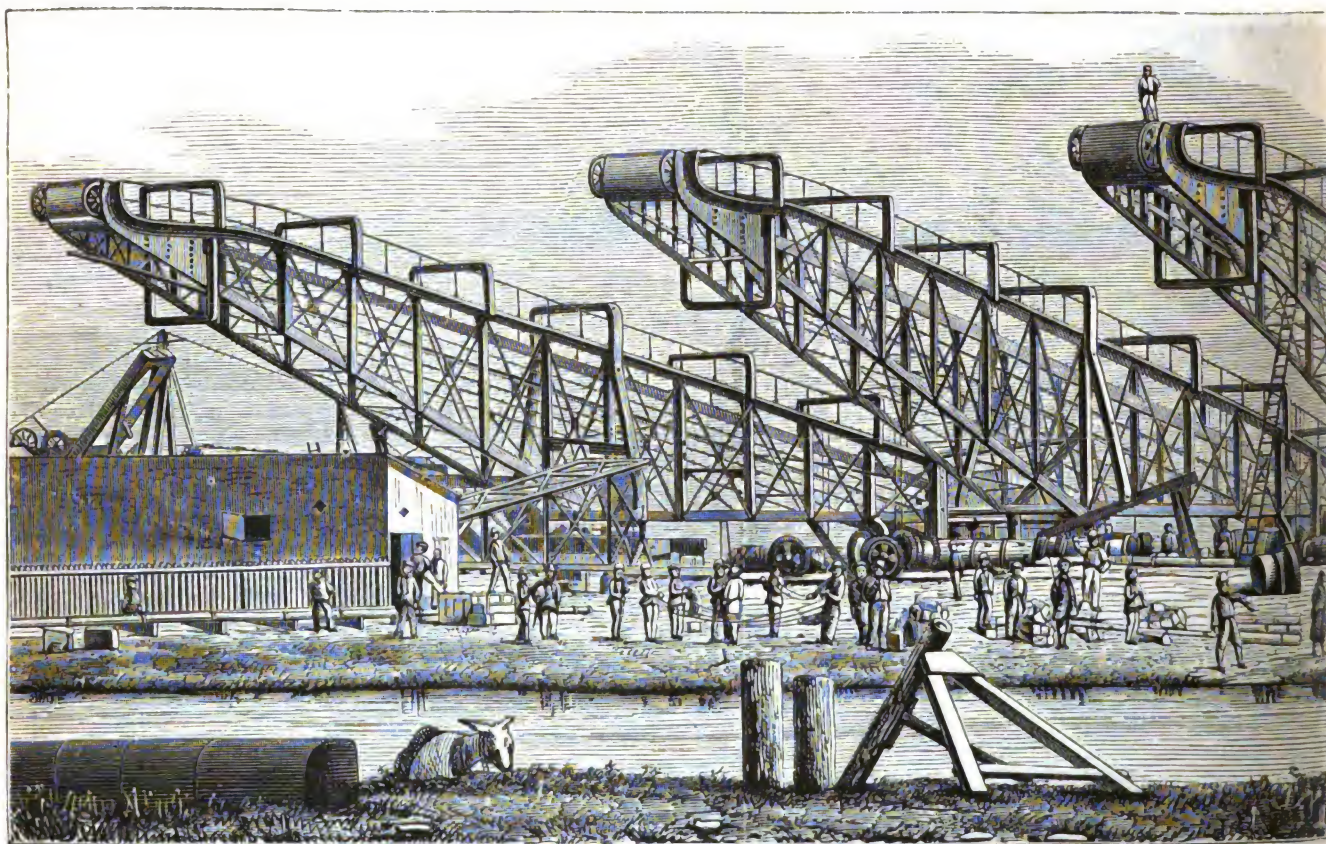
Eight years later, M. Ferdinand de Lesseps proposed to Mohammed Saïd the scheme of reopening the ancient canal of Sesostris; and it is mainly to the engineering enterprise and unremitting activity and energy of M. Lesseps that the world is indebted for the work, which now so rapidly approaches completion.

The first exploration of the isthmus, under his supervision, was made in December, 1854, and January, 1855, and the present line of survey, which was ascertained to be twenty-nine French leagues (about ninety English miles) in length, decided

Suez. The other lakes are called Timsah, Ballah, and Menzalah. The first and smallest of these has long been drying up. To deepen the channel through these lakes; excavate the intervening sections, which, previous to the operations of the company, consisted of arid, sandy, treeless, and almost trackless wastes, with an occasional stratum of calcareous blue clay running through them; and to build the jetties for the protection of the entrance from either sea, and which now form the harbors of Saïd and Suez, was really all the company had to do.

No locks or other artificial appliances will be required, and steamers of the capacity of those now used by the Peninsular and Oriental, and *Messageries Impériales* Companies, will, it is believed, be able to pass through from sea to sea without difficulty or detention.

MECHANICAL APPLIANCES.—A work of so vast and unique a character, as will readily be conceived, has called into requisition appliances for construction of a similarly extensive and original kind. Indeed, the machinery used on this canal

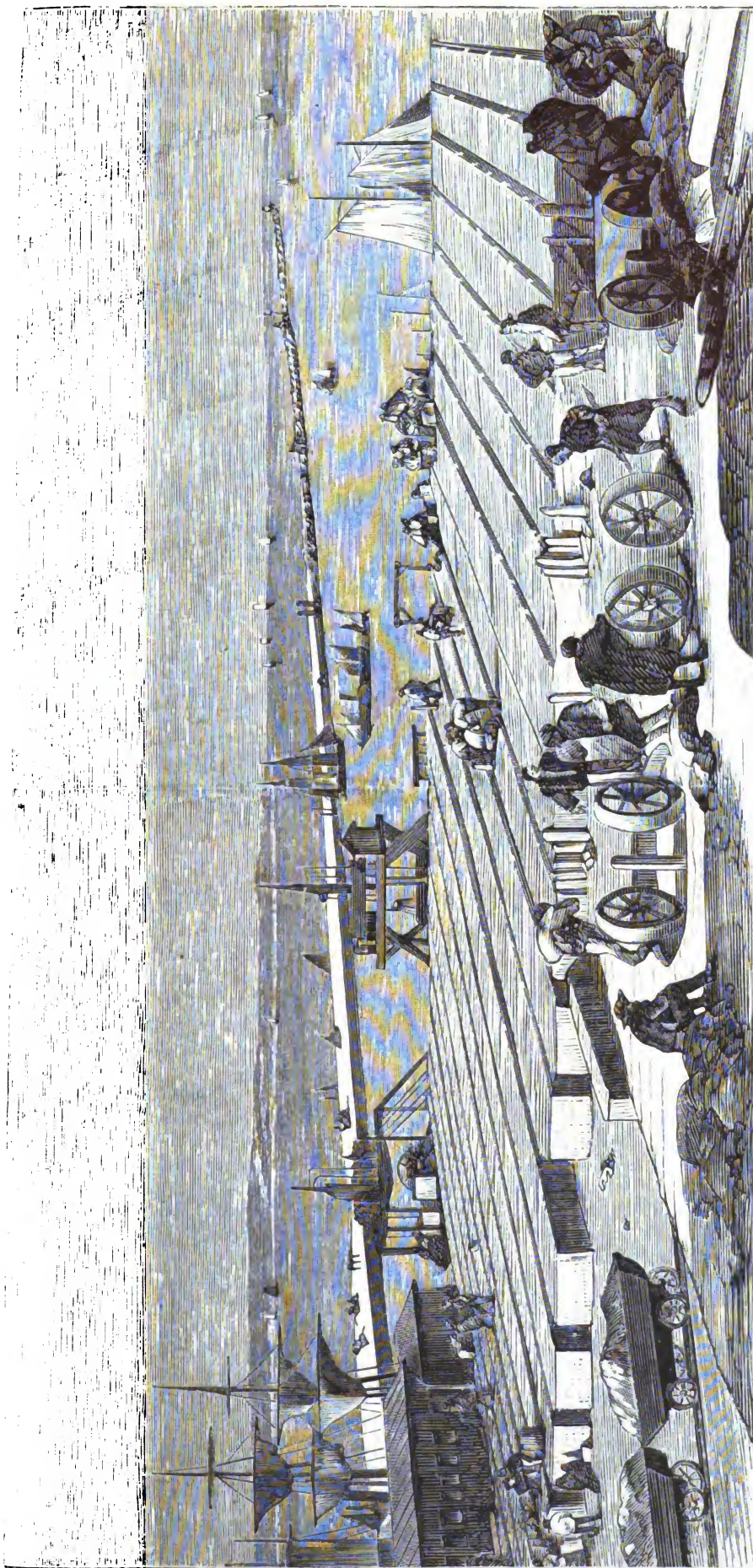


Elevators under Process of Construction.

on. In November, 1855, another international commission visited the isthmus, but beyond the publication of their report (June, 1856), little of consequence was accomplished until 1858, when *La Compagnie Universelle du Canal Maritime de Suez*, or, as it is familiarly known to English readers, the Suez Ship-Canal Company, was organized.

GENERAL VIEW OF THE WORK.—Let the reader imagine a vast ditch one hundred miles in length, three hundred feet wide at the top, one hundred to one hundred and fifty feet wide at the bottom, with an average depth of twenty-four feet, connecting four natural lakes, bisecting a sandy isthmus at its narrowest point, and discharging at either end into a large inland sea, and he will have a fair presentment of what the canal is, or rather is intended to be. These lakes are situated at distances ranging from ten to fifteen miles from each other, and form the natural boundaries, so to speak, of the several divisions of the work. The largest and deepest of these, called *Lacs Amers*, or Bitter Lakes, extend to within fourteen miles of

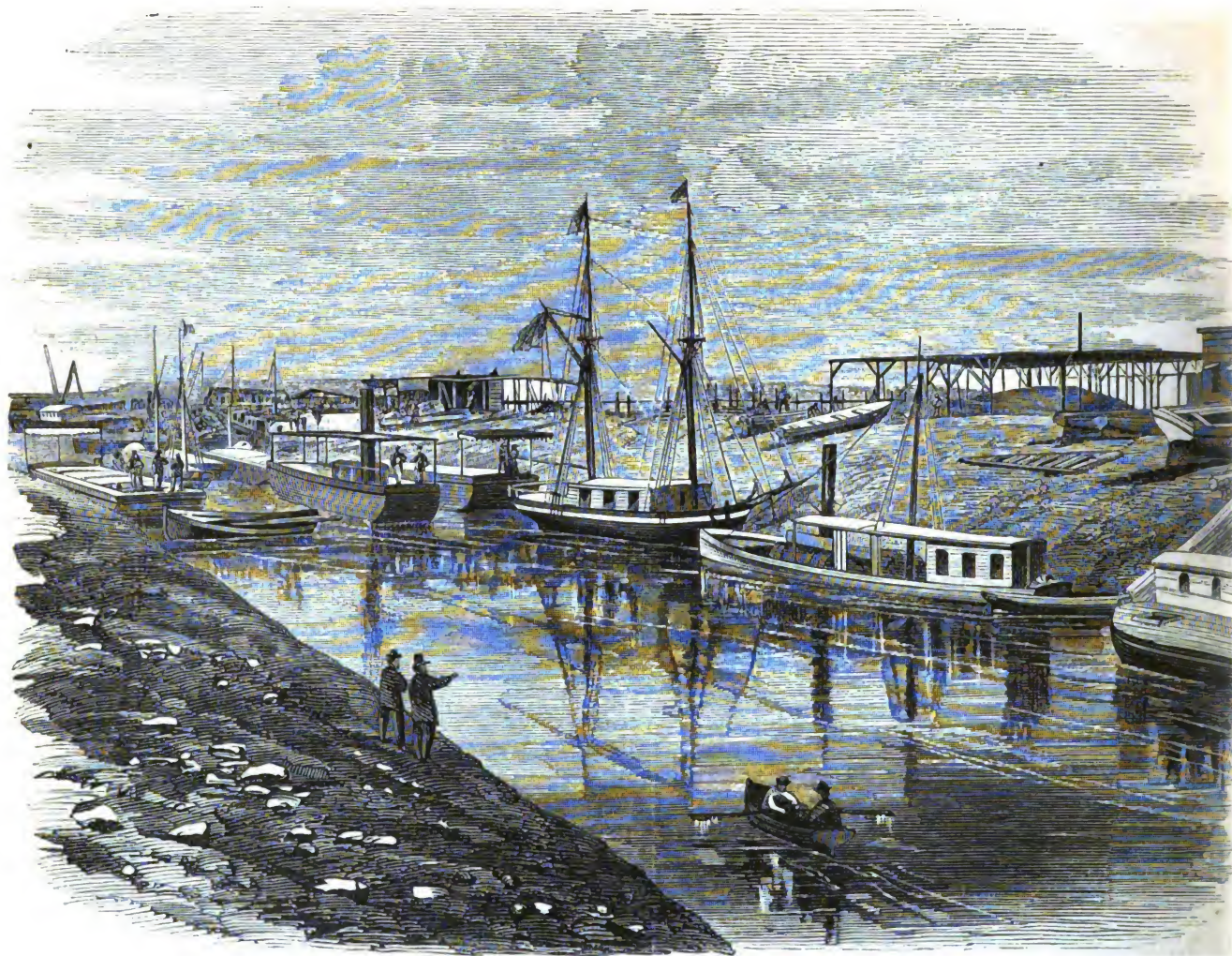
forms one of the most interesting features of the work. Nothing like it is to be found elsewhere. From the gigantic *drague à couloir*, down to the smallest *drague* (dredge), and from the ponderous *élévateur* to the smallest drill or hand machine, every thing is of the most costly kind and elaborate finish. Two hundred and eighty-five machines, representing a force equal to eighteen thousand horses, and consuming twelve thousand two hundred and nineteen tons of coal per month, work day and night on the canal. These machines are divided into sixteen classes, two of which are worthy of especial mention. These are the large dredges (*dragues à long couloir*), and the *excavateurs*. The former are similar in construction to the machines used for dredging-purposes in the British and American seaports and rivers, but they are larger, and have an enormous passage, or spout, attached. By means of a steam-pump attached to the lighter on which this apparatus is mounted, water is mixed with the earth brought up by the dredge, and the semi-fluid mass is discharged through



The Jetties.—Preparing and Shipping the Blocks.

this long pipe, or passage (*coulair*), on to whatever spot may be selected. By means of this machine the sand can be discharged to any distance within two hundred feet beyond the edge of the canal. By this simple contrivance a continuous compact ridge of sand is formed along the entire length of the canal, and this serves to keep out the accumulations of sand which, blown by the frequent storms (*Shimaul* or *Krumseen*), from the surrounding desert, would otherwise be deposited in the canal, and utterly preclude all efforts to keep it open. The ridge thus formed is in some places fully fifty feet high.

PORT SAÏD.—The northern entrance of the canal is situated on the eastern shore of the Mediterranean, one hundred and twenty-four miles north of Alexandria, and thirty miles north of Damietta. Externally, its appearance is not unlike that of the majority of mushroom American towns similarly situated. It is an anomalous sort of place. Bounded northward by the ocean, and southward by the desert, it is equally the product of both. Viewed geologically, it is the practical result of a struggle between salt water and sand; commercially and socially, it is a compound of modern commerce and aboriginal (Arab) ignorance and filth. Little more than half a score of years ago, the site of the present town was a dreary, arid waste. Every necessary of life had to be brought by boat from Damietta; and now every comfort and many of the luxuries of life are easily procured, at all events in much greater abundance and with more facility than in the ancient city of Damietta. It contains nearly one thousand houses, and a population which, though, like that of Cairo (not the Egyptian, but the American Cairo), largely floating, may be fairly estimated at between eight and ten thousand. This population is thoroughly cosmopolitan in its character, for, small as the town is, it numbers representatives from all parts of the world. Every civilized and uncivilized country, apparently, sends its delegate to the Canal Congress. The activity and bustle of the place, heightened as they are by the picturesque effect produced by the motley groups of French, Egyptians, Arabs, English, Americans, Levantines, Italians, and Greeks, working harmoniously together, form its principal attraction. On the occasion of my first visit (October, 1867), I counted twenty-two large-sized vessels in the *avant-port*,



Between Kantara and El-Ferdane—The First Vessels through the Canal.

or basin. Most of these were from North-British seaports, and were freighted with coal and other supplies for the company. Hence the large floating population spoken of. By far the larger number (fully two-thirds) of the inhabitants, however, are employed directly or indirectly by the Canal Company, or by the contractors, Messrs. Boril, Lavalley & Co.

THE JETTIES.—Commencing at the northern end of the canal, the first feature of the work that will attract observation are the jetties. One of the chief difficulties apprehended by the early surveyors and engineers of the canal scheme was the choking up of Port Said by the Nile deposit, and these jetties have been constructed mainly with a view to obviate this difficulty, as well as for purposes of protection to the shipping seeking transit through the canal. They are two in number, known respectively as the East and West Jetty. The length of the latter will be two thousand seven hundred yards, and of the former two thousand yards. The distance between their respective ends will be about four hundred metres (one thousand three hundred feet), and they will form between them, it is estimated, a basin, or harbor, five hundred acres in extent, completely protected from wind or storm, and spacious enough to accommodate all vessels seeking transit through the canal. These jetties are constructed of what appear to be immense blocks of stone. They are not stone, however, but sand, dredged up from the bottom of the canal, mixed with hydraulic lime (*chaux du Thiël*), and then put into wooden cases, or moulds, and allowed to dry. The lime is quarried a few miles down the canal, there ground, and thence transported to the works. Eight mills are kept constantly grinding on this novel, unique, and really interesting process. After sufficient time has been allowed to form and harden them, the wooden

casings are removed, and the sun's rays, which in this latitude are intensely hot, complete the process of making the block. Two or three months suffice to harden them. They weigh twenty tons each, and cost about one thousand francs apiece. When sufficiently dry and ready for use, they are lifted up by a travelling steam-crane (*grue à vapeur*) on to trucks, passed to a tramway, and then pushed by a locomotive down to where the lighters are moored to receive them. They now take a short sea-voyage. After being transferred from the truck by another travelling crane, they are deposited in an inclined position, in rows of three, on another lighter, whence they are taken out to the position they are destined to occupy on the jetty, and there sunk. The rate of progress has been from thirty to forty blocks daily. Over fifteen thousand have been already submerged, and but little remains to be done to complete these magnificent piers. The dimensions of these piers, or jetties, are, twenty-six yards at the base, six yards at the summit, and twelve yards in height.

We now proceed to glance briefly at the several divisions of the canal:

DIVISION OF PORT SAID (LAKE MENZALAH).—This division is fourteen and a half miles long, extending from Port Said to Kilometre Twenty-three, and includes the heavy work on the jetties already described, and the deepening of the canal which lies through the middle of Lake Menzalah, which is itself only separated from the Mediterranean by a low, narrow ridge of sand. The labor performed in this division has been immense. Fears were entertained by many that the sand thrown up by the dredges, to form the banks of the canal, would be too weak to withstand the combined action of the wind and waves in the lakes, and that the canal would in consequence be liable to frequent interruption. Fortunately, these fears have proved



Section of Canal south of El Guisr—Construction Trains.

groundless, and all cause for such apprehension is now removed. In this division 364,367 cubic metres were excavated during the month ending October 15, 1868, which, added to the previous excavation of 6,072,723 metres, left a then total of 2,766,049 metres yet to be taken out.

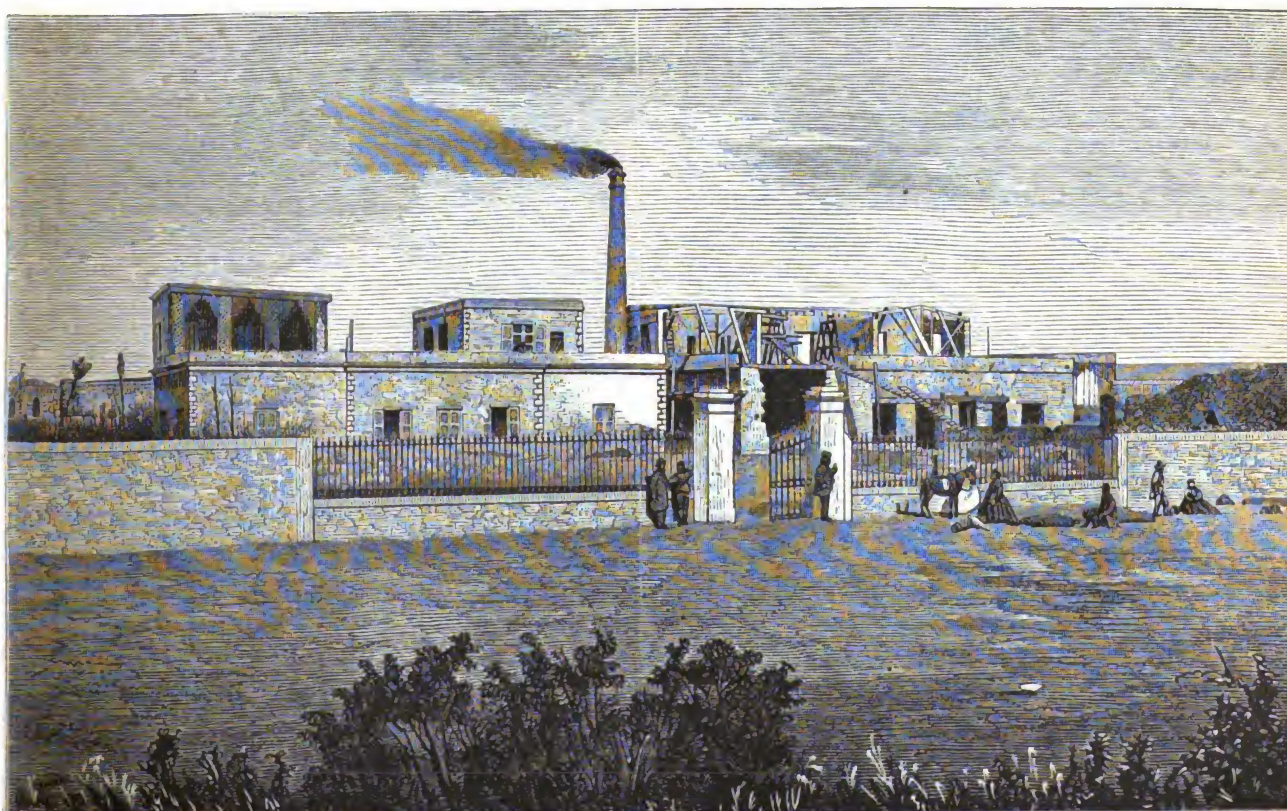
DIVISION OF EL GUISE.—This is the longest division of the canal, and includes all lying between Kilometre Twenty-three and Ismailia, a distance of thirty-five miles. The appearance of the canal, as far as Kantara, is like that on the first division, being as straight—to use a homely metaphor—as a bee-line.

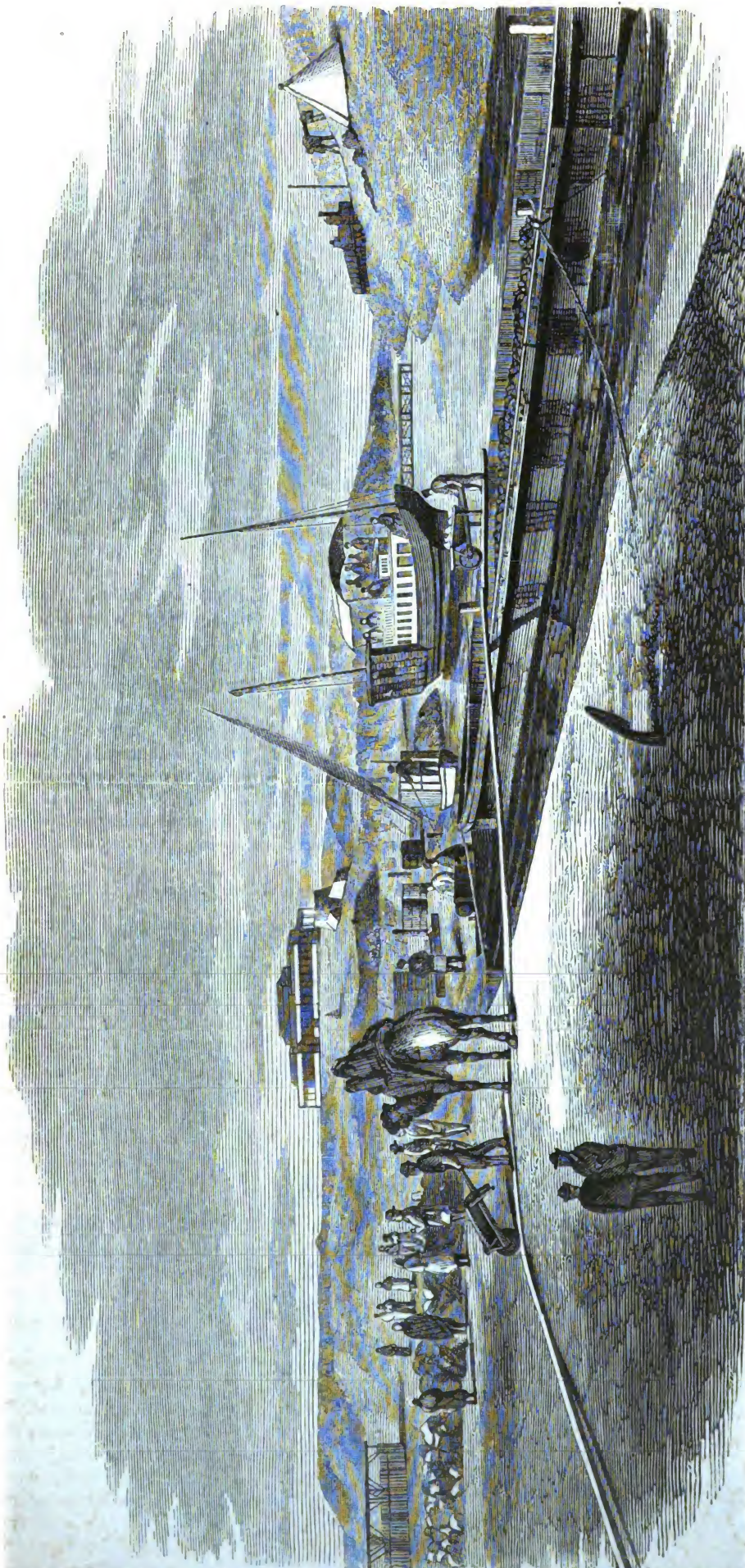
South of Kantara, the work is very heavy, especially at El Guisr. Here are the deepest cuttings, extending a distance of five miles to Lake Ballah. Out of a total of 29,859,044 cubic metres, upward of 9,770,037 yet remain to be excavated to

reach the maximum depth of the canal. Twenty-five dredges and an immense force of laborers are engaged upon this division, and they are taking out about 600,000 cubic metres per month. In some parts of this division, when the canal is excavated to its full extent, the perpendicular depth will be upward of one hundred feet.

KANTARA.—The second point of importance on the canal is situated at the southern extremity of Lake Menzalah. It occupies the site of Mijdol, famous in the history of the Exodus, and has long been an important crossing for the Syrian camel-trains. It is the principal town in this division, is twenty-eight miles from Port Saïd, and is usually reached by the mail-boats in about five hours.

In this, and in each other division of the work, a basin has been





View near Ismailia.

formed in the lake, where the surplus sand and earth are dumped by lighters, termed by the French workmen *gabares à clapets de fond*, and *gabares à clapets latéraux*.

LAKE BALLAH.—Eight miles south of Kantara, the canal enters Lake Ballah, and, soon after passing the little Arab village El-Ferdane, we reach El-Guisr. The plateau upon which this village (El-Guisr) stands is the most elevated point, and the cuttings the deepest upon the whole canal. The labor of twenty thousand Arab *fellahs* was required for two years in cutting a channel deep enough to float the steam dredges from the Mediterranean to this point, and in filling the shallow basin of Timsah, formerly fed by the overflowings of the Nile only. At El-Guisr we found excavators hard at work widening the canal, with construction-trains and locomotives drawn up on the bank for removing the earth more rapidly than it could be done by lighters in the canal. There is yet more to be done in this division before it is fit for the passage of large vessels.

ISMAÏLIA (Lake Timsah).—Ismailia, next to Port Saïd, is the most important point on the canal. It is not only the official headquarters of the company, but the residence of the principal officials. Until within a recent period, the offices of the contractors, MM. Borl and Lavalley, were also located here, but these have been removed to Port Saïd. The town is pleasantly situated near the northern shore of Lake Timsah, and is named after the reigning viceroy, Ismail Pacha, who succeeded his uncle, Saïd Pacha, in January, 1863. Though, like Port Saïd, it owes its origin and growth entirely to the canal, the contrast between the two towns is very marked. The fresh-water canal, from the Damietta branch of the Nile, originally extended as far as a town called Zagazig, about fifty miles to the westward of Ismailia, which was then looked upon as the limit of civilization and habitable villages toward the east. All beyond was sand, desert, and desolation, with wandering tribes of Bedouins to make the desolation dangerous. One of the first operations of the company was to continue the fresh-water canal to the east, and, from a point two or three miles west from the present town, then a howling wilderness, its fertilizing waters now flow through the desert to the sea. It has played an essential part in the construction of the ship canal. Indeed



Cuttings near Serapeum.

without it the latter could hardly have been built. Before it was finished, three thousand camels and donkeys were required to transport the Nile water necessary for the sustenance of the laborers. When finished, the Egyptian Government purchased it for two millions of dollars. It runs nearly at right angles to the Maritime Canal. Its width is twenty-six feet, and its average depth about four feet.

DIVISION OF ISMAÏLIA. — From Ismaïlia, southward, we enter upon the third grand division of the canal. This extends through Lake Timsah and the Bitter Lakes to Kilometre One Hundred and Fifteen. The northern end of the Bitter Lakes is sixty miles from Port Saïd. The lakes themselves are twenty-three and one-half miles long. Up to within a few months past, the navigation of the maritime canal did not extend beyond Ismaïlia; but, on the 18th of March last, the waters of the Mediterranean were admitted into the Bitter Lakes, and there is now uninterrupted navigation to the head of these lakes, and within fifteen miles of Suez, for vessels of ordinary tonnage. The cuttings at Toussoum and Serapeum, passed between Lake Timsah and the Bitter Lakes, are deep, and, next to those already seen at El-Guisr, the most difficult on the whole length of the canal. Our illustration was taken in the bed of the canal, at the latter place.

The Bitter Lakes constitute the most interesting feature of this division. They are estimated to contain nine hundred million tons of water, and it is expected that, from their size and situation, they will obviate the necessity of

locks to break the current, which would otherwise exist in the channel of the canal between the two seas. Through these lakes the canal flows, between banks of the entire width of three hundred and twenty-eight feet, until it enters the last cutting, about five miles from Chalouf, whence it follows the course of the ancient canal to Suez.

DIVISION OF SUZ.—This division is twenty-eight miles in length. The principal points are Chalouf (El-Terraba) and Little Chalouf, or "Eighty-three," on the Fresh-water Canal, where there is a ferry established for the transit of the caravans and trains to and from Mecca.

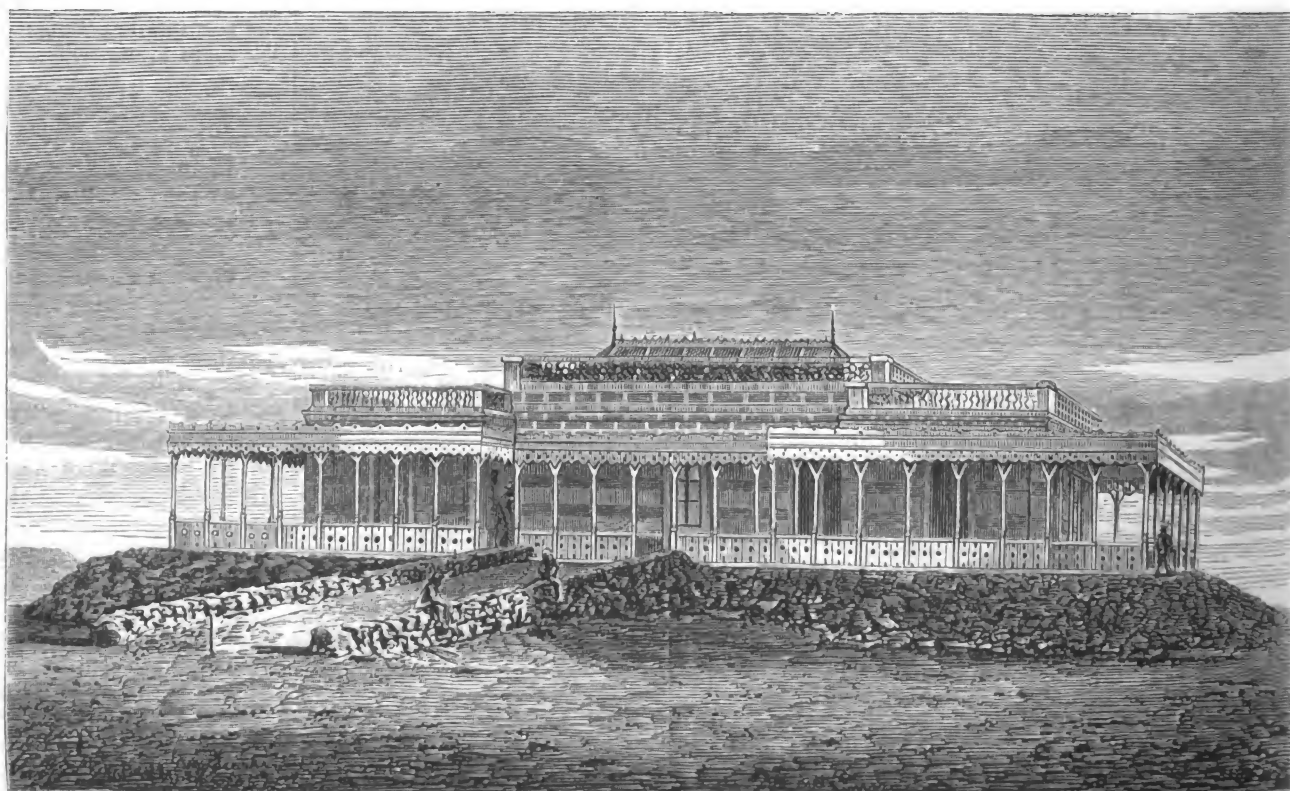
The number of dredges at work on this division is small compared with that engaged upon the preceding sections, the nature of the work requiring a preponderance of hand labor. Upward of thirteen thousand men and one thousand donkeys are engaged upon this division. The majority of this large force are native Arabs (*fellahs*), and they work hard. In close and curious contrast to these simple carriers, the Titanic engines toil and puff as they drag their ponderous claws along through this vast ditch. Nowhere, perhaps, in the world, is the contrast between steam and man power more vividly presented than on this great work.

SUEZ.—Suez, situated at the head of the gulf of the same name, which is a prolongation of the Red Sea, and scripturally famous as the scene of the journey of the Israelitish hosts, has come prominently into notice of late years in connection with the overland route to India and China, and more recently as the southern terminus of the ship-canal. It is likewise the place of embarkation for the Mohammedan pilgrims from Egypt, and the countries of Northern Africa, on their way to the holy cities. The town is built on a low, sandy tract of land, and was formerly a most miserable-looking place. The canal-works here, as elsewhere, have already effected a wonderful revolution. The French may well exclaim, "*Nous avons changé tout cela!*" A magnificent dry-dock has been constructed, and the most extensive dredging and jetty-making operations are in progress. The dry-dock is upward of four hundred feet in length, and nearly one hundred feet broad, while commodious basins, for the secure anchorage of ships and steamers, are being formed in front of it. The new piers are being connected

with the railway to Cairo and with the town of Suez by branch-lines of railway. The Egyptian Government, shamed into activity by the gigantic works carried on by the canal company, is constructing piers and basins of its own at Suez, and, what was twelve years ago one of the filthiest and most indolent of Eastern cities, is now all life and energy.

PRACTICAL RESULTS.—In October, 1867, I came through the canal as far as Ismailia on the first steamer that had navigated it.

October 13th, of the present year, has been fixed as the day upon which it is to be formally opened to the world. It is announced that the Empress Eugénie, and perhaps the emperor himself, will be present, and that the *fêtes* and festivities, with which the day is to be celebrated, will be on a scale of magnitude and magnificence commensurate with the importance of the occasion. During 1868, 2,088 vessels, aggregating 674,048 tons burden, arrived at Port Said, and 270,000 tickets were issued by the Transit Service. According to the estimates of M. de Lesseps, this amount will be increased to three million tons per annum the first year after the completion of the canal, and that, during succeeding years, this amount will be doubled. But these estimates are based upon the successful completion of the canal, and the navigation of it by steamers drawing from sixteen to twenty-two feet water. The full purpose of the ship-canal will not be attained until the largest vessels are able to pass through it, from end to end, so that steamers from Liverpool, London, Southampton, Marseilles, Trieste, or Brindisi, may proceed, without trans-shipment of cargo or delay in Egypt, through the Red Sea to Bombay, Point de Galle, Calcutta, Hong Kong, Shanghai, or Yokohama, as may be desired. Freights to Port Said from British or French ports are no higher than to Alexandria, but, if unloading is to be gone through with at the former port, the heavy tolls through the canal, and the reshipment at Suez for the East, will outweigh the cost of transport by the present route round the Cape, and practically render the canal a financial failure. Whether it will ever pay its constructors as a commercial speculation, when fully dug out for the passage of large vessels, remains to be seen. M. de Lesseps and the French engineers, backed by French capital, have constructed the work. British commerce in the East must furnish the tolls and help to make it pay.



Chalet of the Viceroy, near Ismailia.